CLAIMS:

1. In combination, an internally cooled turbine blade and a rotor disc for a gas turbine engine, the turbine disc and the turbine blade cooperating to form an air cavity therebetween, the air cavity being defined by a disc first wall extending generally radially relative to the turbine disc and along a general direction of a rotation axis of the rotor disc, a disc second wall extending generally parallel to the first wall, an upstream entry end and a downstream end, a flow of cooling air in use entering the air cavity generally at an angle to the first wall by reason of rotation of the air cavity relative to the flow of cooling air, the first wall thereby in use redirecting the flow of cooling air entering the cavity towards the downstream end of the cavity, the turbine blade comprising a series of inlets communicating with the air cavity and with internal cooling passages defined inside the turbine blade, and at least one deflector extending into the air cavity, the deflector extending generally from said first wall to a position nearer to but remote from the second wall, the deflector thereby adapted to divert cooling air entering the cavity away from the first wall and generally towards the second wall.

2. A combination as defined in claim 1, wherein the deflector has a flow surface for contacting and diverting the cooling air flow, and wherein the flow surface extends away from the first wall at an acute angle.

3. A combination as defined in claim 1, wherein said deflector extends across said air cavity less than half the distance from said first to said second wall.

4. A combination as defined in claim 1, wherein said first wall is located on a side of the air cavity corresponding to a pressure side of the turbine blade.

5. A combination as defined in claim 1, wherein said series of inlets comprises a linear array of inlets extending from a first inlet to a last inlet, the last inlet being closest to the downstream end, and wherein said deflector is adapted to

redirect the flow of cooling air towards at least one inlet, the at least one inlet being any of said inlets other than the last inlet.

6. A combination as defined in claim 1, wherein said deflector is located intermediate the upstream and downstream ends of the air cavity.

7. A combination as defined in claim 1, wherein said deflector has a leading surface relative to the cooling airflow and wherein the leading surface is non-perpendicular to the first wall.

8. A combination as defined in claim 1, wherein said deflector is adapted to cause the cooling air flow to swirl in at least a pair of counter-rotating principal vortices inside the air cavity.

9. A combination as defined in claim 1, further comprising a second deflector, the second deflector extending away from the second wall towards the first wall, the second deflector extending only part of the distance across the cavity towards the first wall.

10. A combination as defined in claim 1, wherein the air cavity is defined between a turbine blade root portion and a blade attachment slot defined in said rotor disc, the slot defining the first and second walls, and wherein said deflector integrally extends from said root portion.

11. An internally cooled turbine blade having a root portion adapted to be received in a blade attachment slot defined in a rotor disc, the turbine blade comprising:

a plurality of internal cooling flowpaths each having at least one inlet defined in a surface of said root portion, the plurality of inlets arranged in the surface generally in a linear array relative to one another, the linear array defining a linear axis, and

at least one deflector extending from a peripheral side of said surface and partially across the surface towards an opposing peripheral side of the surface, said deflector having a principal face adapted to in use contact and redirect a cooling flow entering the slot, wherein the face is disposed at an acute angle relative to said linear axis.

12. An internally cooled turbine blade as defined in claim 11, wherein said deflector is positioned on the blade such that the deflector is disposed substantially adjacent a sidewall of said blade attachment slot when the blade is installed on the rotor disc, the deflector thereby being adapted to redirect a flow cooling air in the slot generally away from the sidewall and towards an opposing sidewall of the slot.

13. An internally cooled turbine blade as defined in claim 12, wherein said one side corresponds to a pressure side of an airfoil of the turbine blade.

14. An internally cooled turbine blade as defined in claim 12, wherein said surface is an undersurface of said root portion.

15. An internally cooled turbine blade as defined in claim 11, wherein said deflector is located adjacent an inlet having an intermediate position in said linear array.

16. An internally cooled turbine blade as defined in claim 11, further comprising a second deflector.

17. An internally cooled turbine blade as defined in claim 15, wherein said deflector is adapted to redirect a flow of cooling air in the slot towards said intermediate inlet.

18. A turbine blade adapted to be mounted to a turbine disc to co-operate with the disc to form an air cavity therebetween, the air cavity having first and second

opposing walls extending generally radially relative to the turbine disc and generally along a direction parallel to a turbine disc axis of rotation, the disc in use rotating relative the a cooling air flow supplied to the cavity and the air cavity first wall thereby first redirecting the flow of cooling air entering the cavity, the turbine blade comprising:

a root portion having a surface adapted to partially define the air cavity when the blade is installed on the disc, the root portion having first and second sides corresponding to said first and second opposing walls, the first and second sides having respective ends which define respective ends of the surface;

an array of inlets extending along the surface, the inlets communicating with internal cooling passages defined inside the turbine blade; and

at least one deflector extending from the surface and spanning the surface substantially from the first side to a position intermediate the first and second sides, the deflector being spaced apart from ends of the surface.

19. A turbine blade as defined in claim 18, wherein the deflector extends generally normally from the first side.

20. A turbine blade as defined in claim 18, wherein at least a portion of the deflector extends from the first side at an acute angle.

21. A turbine blade as defined in claim 18, wherein said intermediate position is closer to the first side than the second side.

22. A turbine blade as defined in claim 18, wherein said deflector is adapted to in use redirect cooling air flowing along the first side towards at least one inlet upstream of an ultimate inlet of said array of inlets.

23. A turbine blade as defined in claim 18, wherein said first side corresponds to a pressure side of an airfoil of said blade.

24. A turbine blade as defined in claim 18, wherein said deflector is integral with said root portion.

25. A turbine blade as defined in claim 22, wherein said deflector is adapted to in use divert cooling air to increase an amount of cooling air flowing into said at least one inlet.

26. A method of supplying a coolant flow to an internally cooled turbine blade, the blade having a root portion defining a plurality of coolant inlets, the root portion being received in a blade attachment slot defined in a rotor disc of a gas turbine engine, the method comprising the steps of: a) directing a swirl of coolant into said blade attachment slot, and b) deflecting the coolant inside the blade attachment slot while substantially preserving a swirling nature of the coolant flow to thereby prevent a low pressure region from forming in a position corresponding to a centre coolant inlet.

27. A method as defined in claim 26, wherein step b) includes the step of inducing a new vortex structure to the swirl of coolant.

28. A method as defined in claim 26, wherein the deflector does not directly split a primary swirl flow entering the slot.

30. A method as defined in claim 28, wherein step b) includes the step of dividing the swirl into a plurality of smaller principal swirls.

31. A method of regulating the division of a flow of cooling air supplied to at least three cooling inlets leading to cooling passages defined inside a rotating airfoil in a gas turbine engine, the rotating airfoil being mounted to a rotary disc and co-operating therewith to form an air cavity therebetween, the air cavity having an entrance for admitting cooling air thereto, a downstream end at an end of the cavity opposite the entrance, and a sidewall extending radially along a disc radial axis and

axially between the entrance and the downstream end, the at least three inlets communicating with the air cavity and arranged in an array extending along the air cavity from a first of said inlets to a last of said inlets, the last inlet being closest to the cavity downstream end, the method comprising the steps of:

a) rotating the rotary disc with the airfoil mounted thereto;

b) directing cooling air into the air cavity through the entrance and substantially along the sidewall towards the downstream end; and

c) at a position intermediate the entry and downstream end, directing cooling air away from said sidewall towards at least one inlet intermediate the first and the last inlets.

32. A method as defined in claim 31, wherein step c) includes increasing the pressure in the cooling flow at a position corresponding to the at least one intermediate inlet relative to a pressure resulting from an undeflected flow.

33. A method as defined in claim 31, wherein the cooling air has a vortical nature, and wherein step c) comprises pushing a low pressure region of a vortex of cooling air away from the at least one middle inlet while generally preserving the vortical nature of the cooling flow.

34. A method as defined in claim 33, wherein step c) comprises the step of rearranging a vortex structure of the cooling flow.

35 . A method as defined in claim 33, wherein the cooling flow is directed by a root portion of the airfoil.

36. A method as defined in claim 35, wherein the root portion extends only partly across a width of a surface of the airfoil on which the portion is located.